

REMARKS

Further and favorable reconsideration is respectfully requested in view of the foregoing amendments and following remarks.

Telephone Discussion with the Examiner

Applicants kindly thank the Examiner for taking the time to discuss the application with Applicants' representative on October 25, 2007. During this conversation, the Examiner clarified his requirement for new drawings. Specifically, the Examiner stated that a drawing relating to the 3-D structure, as in claims 17-19, would be sufficient to satisfy this requirement.

Drawings

New drawings (Figures 1, 2A and 2B) are submitted herewith, in response to the Examiner's requirement to furnish a drawing. Figure 1 corresponds to claims 17 and 18, and Figure 2 corresponds to claim 19.

Fig. 1 shows the sound-absorbing material of the present invention, wherein the non-woven fabric (2) is in the shape of a polyhedron (hexahedron) and the surface material (1) is layered on two (both side) faces of the polyhedron (hexahedron).

Fig. 2A shows the sound-absorbing material of the present invention, wherein the non-woven fabric (2) is in the shape of a column. Fig. 2B shows the sound-absorbing material of the present invention, wherein the non-woven fabric (2) is in the shape of a cylinder. In the sound-absorbing materials shown by Figs. 2A and 2B, the surface material (1) is layered on the curved face of the column or the cylinder.

Support for these drawings is found, for example, on page 24, line 25 to page 25, line 6 of Applicants' originally filed specification. Therefore, no new matter has been added to the application by the submission of these drawings.

Specification Amendments

The specification has been amended on page 4 to incorporate a brief description of the drawings. Support for this amendment is set forth on page 24, line 25 to page 26, line 6 of

Applicants' specification. Therefore, no new matter has been added to the application by this amendment.

Claim Amendments

Claim 1 has been amended to incorporate the limitations of claim 9, as a result of which claim 9 has been cancelled, without prejudice. Additionally, claims 10, 11 and 14 have been amended to change their dependency.

Minor, editorial changes have also been made to the claims.

No new matter has been added to the application by these amendments.

Rejection of Claims Under 35 U.S.C. § 112, First Paragraph

The rejection of claims 17-19 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement has been rendered moot in view of the submission of new drawings, discussed above.

Specifically, the Examiner states that the claimed limitations of the nonwoven fabric [being] in the three dimensional shape is not understood without drawings demonstrating the configuration. As discussed in detail above, Applicants have submitted new drawings demonstrating the configurations set forth in the claims.

Accordingly, this rejection is no longer tenable and should be withdrawn.

Patentability Arguments

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

Rejections Under 35 U.S.C. § 103(a)

Rejections based on Smith, Haines et al. and Bair

The rejection of claims 1-8, 16 and 20-23 under 35 U.S.C. § 103(a) as being unpatentable over Smith (USP 5,766,745) in view of Haines et al. (US 5,459,291), as well as the rejection of claims 9-14 under 35 U.S.C. § 103(a) as being unpatentable over Smith in view of Haines et al., and further in view of Bair (USP 4,957,794), are respectfully traversed.

The Position of the Examiner

The Examiner takes the position that Smith discloses a sound absorbing material comprising a nonwoven fabric. The Examiner admits that Smith does not disclose wherein the nonwoven material includes a surface material with an air permeability of not more than 50 cc/cm²/second, wherein and the nonwoven and the surface material are layered.

The Examiner states that Haines et al. disclose a nonwoven material with a surface material described as high in airflow resistance, layered.

The Examiner takes the position that it would have been obvious to one of ordinary skill in the art to [] Haines et al. to have an airflow resistance material layered with a nonwoven material in order to increase the airflow resistance and thus the sound attenuating properties. The Examiner states that while Smith as modified [by Haines et al.] does not disclose the specific density and air permeability claimed, it would have been obvious to one of ordinary skill in the art to select such parameters since it has been help that discovering an optimum value of a result effective variable involves only routine skill in the art.

Additionally, the Examiner states that, with respect to claims 9, 10 and 13, Smith as modified [by Haines et al.] discloses the invention as claimed, except wherein the surface material is a spun bonded non-woven fabric or a wet laid nonwoven staple fabric, the nonwoven fabric being comprised of a heat resistant staple fiber, and the heat resistant fiber being an aramid staple fiber. The Examiner takes the position that Bair teach that aramid fibers can be laid with other fibers and wet laid.

Applicants' Arguments

Applicants enclose herewith Table 1, which compares the subject matter of the pending claims with the disclosures of the cited prior art references, for the Examiner's careful consideration.

(1) Claim 1

The invention of claim 1 is as follows;

A sound-absorbing material, wherein (a) a non-woven fabric with a mass per unit area of 150 to 800 g/m² and a bulk density of 0.01 to 0.2 g/cm³ and (b) a surface material with an air permeability of not more than 50 cc/cm²/sec measured according to JIS L-1096 are layered, and (b) the surface material is a spun bonded non-woven fabric or a wet-laid non-woven staple fabric.

(2) Smith (USP 5,766,745)

Smith discloses a nonwoven textile for insulating a structure against heat and sound. The nonwoven textile of Smith comprises at least one composite having top, a middle and a bottom layer (figure 2, abstract, etc.).

However, it is clear from the enclosed Table 1 that, in Smith, there is no teaching nor suggestion of a surface material of the presently claimed invention.

(3) Haines et al. (USP 5,459,291)

Haines et al. disclose a nonwoven material with a facing sheet (surface material) with a high airflow resistance (abstract, etc.). However, there is no teaching nor suggestion of an embodiment of the facing sheet.

(4) Bair (USP 4,957,794)

Bair teaches that "aramid fluff can be mixed with other fibers and wet laid---" (column 4, lines 38-63). However, Bair neither teaches nor suggests that a wet-laid non-woven staple fabric has an air permeability of not more than 50 cc/cm²/sec and is used as a surface material.

(5) The surface material of the presently claimed invention is a spun bonded non-woven fabric or a wet-laid non-woven staple fabric and has an air permeability of not more than 50 cc/cm²/sec.

It is clear from the enclosed Table 1 that Smith, Haines et al. and Bair fail to teach or suggest such particular surface material.

Further, these cited prior art references neither disclose nor suggest the combination of (a) a non-woven fabric with a mass per unit area of 150 to 800 g/m² and a bulk density of 0.01 to 0.2 g/cm³ and (b) a surface material having an air permeability of not more than 50 cc/cm²/sec and being a spun bonded non-woven fabric or a wet-laid non-woven staple fabric.

Accordingly, even if Smith is combined with Haines et al. and/or Bair, the invention of Applicants' claim 1 would not have been obvious from these cited prior art references to one of ordinary skill in the art.

(6) Effect of the presently claimed invention

Furthermore, by using above particular non-woven fabric (a) and surface material (b) together, a sound-absorbing material of the presently claimed invention is excellent in sound absorbency (e.g., normal incidence sound absorption coefficients, sound absorption coefficients in reverberation chamber), flame retardancy, recyclability, and workability (page 8, lines 17-21 of the specification). Such excellent effects of the presently claimed invention are shown in the working Examples of the specification (page 32, line 21 to page 50, line 19).

Furthermore, Applicants provide experimental data showing that the sound-absorbing material of the present invention is excellent in sound absorbency, in a form of Rule 1.132 Declaration, submitted herewith. In these experiments, the normal incidence sound absorption coefficients of the sound-absorbing materials (RuBA-1 and RuBA-2), in accordance with the presently claimed invention, were compared with that of the textile structure disclosed in the cited Smith reference.

It is clear from the experimental data (for example, Figure 1) that the sound-absorbing material of the presently claimed invention effectively absorbs sound (especially, relatively high

frequency sound) as compared with that of Smith. The Examiner is respectfully requested to consider the Rule 1.132 Declaration in its entirety.

Since claims 2-8 and 10-23 are directly or indirectly dependent on claim 1, the subject matter of the dependent claims is patentable over the cited references for the same reasons that the subject matter of claim 1 is patentable over the cited combination of references.

For these reasons, the invention of Applicants' claims is clearly patentable over the cited combinations of Smith, Haines et al. and/or Bair.

Rejection based on Smith, Haines et al. and JP 2002-182655

The rejection of claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Smith in view of Haines et al., and further in view of JP 2002-182655 (JP '655) is respectfully traversed.

The Position of the Examiner

The Examiner takes the position that, with respect to claim 15, Smith as modified [by Haines et al.] discloses the invention as claimed, except wherein the nonwoven fabric and the surface material are comprised of the same kind of synthetic fiber. The Examiner states that JP '655 disclose an acoustic absorber having a surface material and a base material [which] are the same kind of polymeric fiber. The Examiner states that it would have been obvious to combine the teachings of JP '655 to have the surface material and the base material be the same kind of fiber with the absorber of Smith as modified to allow for ease of bonding between the two layers.

Applicants' Arguments

Initially, since claim 15 is dependent on claim 1, the subject matter of claim 15 is patentable over Smith in view of Haines et al. for the same reasons discussed above, regarding claim 1. JP '655 fails to remedy the deficiencies of these references.

Further, JP'655 (abstract) discloses an acoustic absorber having a surface material and a base material, wherein the surface material and the base material are the same kind of polymeric fiber.

However, '655 also discloses on page 2, column 2, line 49 to page 3, column 3, line 7 ([0008]) of Japanese laid-open patent gazette that "In the acoustic absorber according to the present invention, it is necessary to use a surface material consisting of cloth with the mass per unit area of 30g/m^2 or more and an air permeability of not less than $80\text{ cm}^3/\text{cm}^2/\text{sec}$ measured according to JIS L-1096.-----If the air permeability is less than $80\text{ cm}^3/\text{cm}^2/\text{sec}$, the sound absorbency performance of the base material cannot be sufficiently effected.". Please see the English translation of page 2, column 2, line 49 to page 3, column 3, line 7 of JP '655, submitted herewith.

On the other hand, a surface material of the present invention has an air permeability of not more than $50\text{ cc/cm}^2/\text{sec}$.

Accordingly, JP '655 clearly teaches away from the presently claimed invention.

For these reasons, the invention of Applicants' claims is clearly patentable over the cited combination of Smith, Haines et al. and JP '655.

Conclusion

Therefore, in view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

Akira TAKAYASU et al.

By: 

Amy E. Schmid
Registration No. 55,965
Attorney for Applicants

AES/vlw
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
April 11, 2008

Table 1 : Comparisons of the present inventions and the cited prior art references

The present inventions (Proposed claims)	D1 : Smith(US5766745)	D2 : Haines et al. (US5459291)	D3: Bair et al. (US4,957,794) D4: JP2002182655 D5: Noxon(US5035298)
Claim 1: A sound-absorbing material, wherein (a) a non-woven fabric	A textile structure (nonwoven textile insulation) includes at least one composite having three layers (top, middle and bottom). (abstract and column 1, lines 5-10)	A sound absorption laminate comprises (abstract)	
(a) with a mass per unit area of 150 to 800 g/m ² and a bulk density of 0.01 to 0.2 g/cm ³	The middle layer is a densified matt or batting, and the top and bottom layer are less densified matt or battings.	a porous insulation substrate (thermoplastic glass fiber or polymeric fiber blanket)	
and (b) a surface material with an air permeability of not more than 50 cc/cm ² /sec measured according to JIS L-1096 are layered,	<u>No mention</u>	and a facing sheet with a high air flow resistance. <u>There is no mention about concrete examples of the facing sheet.</u>	
and (b) is a spun bonded non-woven fabric or a wet-laid non-woven staple fabric.	<u>No mention (OA page 6)</u>	<u>No mention</u>	<u>No mention</u>

Table 1 : Comparisons of the present inventions and the cited prior art references

Claim 2:(a)is a fabric in which a thermoplastic staple fiber and a heat resistant staple fiber with an LOI value of not less than 25 are intertwisted.	carbonaceous fiber : acrylic fiber (column 5, lines 7-15) Examples of other reinforcing and/ or conductive fibers (column 5, lines 15-25)		
Claim 3:the weight ratio of the thermoplastic staple fiber and the heat resistant staple fiber is in a range of 95:5 to 55:45.	Each layer of the composite contains at least 10% by weight of carbonaceous fibers. (abstract)		
Claim 4:the weight ratio of the thermoplastic staple fiber and the heat resistant staple fiber is in a range of 85:15 to 55:45.	Each layer of the composite contains from about 10% to 85% of the carbonaceous fiber.(column5,lines25-28)		
Claim 5 : the thermoplastic staple fiber is at least one kind of staple fibers selected from the group consisting of a polyester fiber, etc.	Polyester, polyolefin, nylon, etc. (Examples of other reinforcing and /or conductive fibers) (column 5, lines 20-25)		
Claim 6: the heat resistant staple fiber is at least one kind of staple fibers selected from the group consisting of an aramid fiber etc.	Alamid et al.(column 5, lines 20-25)		

Table 1 : Comparisons of the present inventions and the cited prior art references

Claim 7: the thermoplastic staple fiber is a polyester staple fiber and the heat resistant staple fiber is an aramid staple fiber.	Polyester, aramid, et al. (column 5, lines 20-25)		
Claim 8: (a) is produced by needle punch method or water jet method	The densified mat or batting is needled punched. (column 5, line 37)		
Claim 9: (b) is a spun bonded non-woven fabric or a wet-laid non-woven staple fabric.	No mention (OA page 6)	No mention	No mention
			D3(column4,lines38-64) The aramid fluff can be mixed with a thermo-plastic staple or short fiber pulp and wet laid and then bonded to make a permeable mat of low density.
Claim 10: the wet-laid non-woven fabric is comprised of a heat resistant staple fiber with an LOI value of not less than 25.			

Table 1 : Comparisons of the present inventions and the cited prior art references

Claim 11:the wet-laid non-woven fabric is comprised of a heat resistant staple fiber with an LOI value of not less than 25 and a silicate mineral.	the adhesive is either sodium silicate or other silicates. (column 6, lines 45-48)		
Claim 12: the silicate mineral is mica.	<u>No mention</u>	<u>No mention</u>	<u>No mention</u>
Claim 13:the heat resistant staple fiber is an aramid staple fiber.	Aramid (column 5, lines 20-25)		
Claim 14:(b) has a dust generation number of not more than 500 particles/0.1 ft ³ of particles with a diameter of not less than 0.3 μ m measured by the tumbling method according to JIS B-9923 6.2(1.2).	---, dust and other irritants are problems not only for humans, but also for equipment. (column1, lines 60-63)		
Claim 15:(a) and (b) are comprised of the same kind of synthetic fiber.	<u>No mention</u>	<u>No mention</u>	D4 (abstract) The base material and the skin material are composed of polymers of the same system.

Table 1 : Comparisons of the present inventions and the cited prior art references

Claim 16:(a) and (b) are layered by bonding, and the number of the bonding points of (a) and (b) is not more than 30 points/cm ² , and the ratio of the total surface area of the bonding points to the total surface area of the bonding points and the non-bonding points is not more than 30%.			
Claim 17:(a) is in the shape of a polyhedron and (b) is layered on two or more faces of the polyhedron.			D5 (abstract) Three dimensional shapes in sound absorbing panels, including cylinders.
Claim 18: (a) is in the shape of a hexahedron and (b) is layered on both side faces of the hexahedron.			
Claim 19:(a) is in the shape of a column or a cylinder and (b) is layered on the curved face of the column or the cylinder.			

Table 1 : Comparisons of the present inventions and the cited prior art references

Claim 20: The sound-absorbing material having a multilayer structure comprising at least one or more layers of each of (a) and (b), wherein the both layers are united.			
Claim 21: The sound-absorbing material used as a vehicle interior material or a vehicle exterior material.			
Claim 22: The sound-absorbing material used as a sound-absorbing material for a lawn mower.			
Claim 23: The sound-absorbing material used as a sound-absorbing material for a breaker.			